ARE CIVILIAN MUNITIONS CARRIERS READY

FOR TWO MAJOR THEATER WARS?

Graduate Research Paper

Richard C. Leatherman, Major, USAF

AFIT/GMO/LAL/99E-7

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GRADUATE RESEARCH PAPER

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Degree of Master of Air Mobility

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Abstract

The United States military relies upon the civilian sector to provide the bulk of transportation assets for the movement of ammunition from the Army's depots to the seaports. Due to numerous factors, this business is extremely competitive and the number of carriers is limited. When the economy is strong, these companies may not have excess capacity ready to respond to the needs of the military. The transition period from peace to war is a time of potential transportation shortages, particularly during the earlier stages. Without the civilian munitions carriers, the ammunition will not make it to the warfighter.

The primary question answered by this study is: Can civilian munitions carriers meet the requirements of the Department of Defense during two near simultaneous major theater wars? This study examines the current stateside distribution system for Department of Defense munitions. It also compares the current capabilities of the civilian transportation sector to the requirements outlined in the Mobility Review Study Bottom-Up Review Update (MRS BURU) and in two Army Surface Distribution Plans.

The study found that civilian munitions carriers can meet the requirements in both Surface Distribution Plans, but spot shortages do occur when compared to MRS BURU.

Finally, five options for possible action are presented. These options include: implementing no changes, trucking containers to nearby intermodal railyards, purchasing more railcars, establishing agreements between DoD and the civilian sector, and purchasing more prepositioned stocks of munitions.

ARE CIVILIAN MUNITIONS CARRIERS READY FOR TWO MAJOR THEATER WARS?

I. Introduction

General Issue

Historically, the Department of Defense (DoD) has relied heavily upon civilian companies to move military equipment and supplies from military depots to airports and seaports within the United States. The military has concentrated its transportation assets on the need to move materials within a theater of operations while relying upon the civilian transportation industry to move goods within the United States. The civilian sector has a well-established transportation system within the country and it has been cost effective to utilize them for these stateside moves.

> Over 50 percent of our total strategic sealift capacity and nearly 90 percent of our surface capacity in CONUS (Continental United States), rail, seaports, and motor assets come from the private sector. As a result, we are vitally interested in what is happening within the commercial sector; and that impacts the close relationship we have with that industry. A professional partnership between a strong commercial transportation industry and the military remains absolutely crucial to our national defense-now and in the future. (Weber, 1997: 79)

With the changes in national strategies that have occurred since the end of the Cold War, the need for fast and efficient transportation is even more critical. By basing more forces in the United States and fewer overseas, the need for rapid response has become more important.

As we continue to examine the future security environment with various studies, including the Mobility Requirements Study and Bottom-up Review, it is clear that strategic mobility will increasingly become the linchpin in U.S. national security strategy. Just 10 years ago we had more than 500,000 U.S. military personnel forward deployed in Europe and throughout the Asian theater. Before this decade is over, we are likely to see this figure cut by two-thirds. When America then chooses to respond militarily, the vast majority of its forces will have to be deployed and sustained from the continental United States. (Fogleman, 1994: 39)

In the past, civilian firms maintained excess capacity that the military could rely upon to move goods. Recently, the trend in the civilian sector has been to streamline companies to lower their costs while meeting their requirements. As companies have downsized, the excess capacity that the Department of Defense relied upon in the past has begun to disappear.

Much of the commercial transportation surge capability that existed is being trimmed through restructuring. The commercial transportation industry has become more efficient and divested itself of excess capacity. For example, rail is much more efficient today. Railroads have 700,000 fewer rail cars, 550,000 fewer employees, and 10,000 fewer locomotives than in 1960. (Rutherford, 1995: 13)

General Ronald Fogleman, past Commander in Chief, United States Transportation Command (USTRANSCOM) pointed to this concern in an article for the magazine Defense. "As a command (USTRANSCOM) that depends on the commercial transportation sector for a significant portion of its total capability, the changes taking place in the domestic and international business communities also threaten the readiness of the defense transportation system" (Fogleman, 1994: 37).

General Rutherford, another past commander of USTRANSCOM also raised this issue before the Senate. He said that:

We (USTRANSCOM) support a strong U.S. commercial transportation industry. We want to maintain access to commercial lift during this period

> of Department of Defense and commercial downsizing and restructuring. In the past DoD relied on the excess capacity in the commercial transportation industry to move our forces and material during a crisis. To survive in today's competitive environment commercial operators are eliminating excess capacity. This impacts how DoD conducts business with our partners in the transportation industry. To ensure access to commercial transportation during a contingency we are working to channel the government's transportation business to those commercial operators committing their assets to support operations in peace and war. (Rutherford, 1995: 4)

There is no indication that the Department of Defense's reliance upon the civilian transportation sector will change in the near future. "The Fiscal Year 1997-2001 program continues the long-standing partnership between the Department of Defense and the transportation industry, depending primarily on the private sector for the capabilities it can provide and using defense funds to buy capabilities that have little or no commercial utility" (National Military Strategy, 1999). DoD also has created a program called the Contingency Response Program or CORE to help with this problem. It is a "(DOD) Transportation emergency preparedness program designed to ensure that the Department of Defense receives priority commercial transportation services during defense contingencies prior to the declaration of national emergency and during mobilization" (Contingency Response Program, 1999). This raises the question, with downsizing can the civilian transportation sector meet the requirements of the military during a near simultaneous two major theater war scenario.

Importance of the Research

The Department of Defense conducts annual joint exercises to evaluate the movement of goods from the Continental United States (CONUS) to overseas locations. These exercises are designed to practice wartime procedures. These tests have value in

pinpointing deficiencies in most of the distribution system. Unfortunately, due to the small volume of munitions shipped during these exercises, the stateside distribution system is not effectively tested. Due to the high costs associated with a full-scale test, the military is unable to test the system completely.

The Department of Defense primarily uses motor carriers (approximately 80%) to transport munitions during peacetime, but during war approximately 90% of the munitions are going to be moved by rail (Roll, 1998 and Lehman, 1998). Does this disparity between peacetime actions and wartime plans present a problem? This concern extends outside the Department of Defense to the civilian sector. A manager at Union-Pacific Railroad expressed this concern by saying, "At this time, the DoD uses very few COFC (Container on Flat Car), yet their rail requirements (ammunition only) for war time are estimated at 90% of their total transportation needs" (Snodgrass, 1999).

Problem Statement

With a dramatic change in National Military Strategy following the collapse of the Soviet Union, new demands were placed upon the logistics support required by the military.

> Since the end of the Cold War, our national security strategy has shifted from a force that is forward deployed to a force that is domestically based and must respond to operations anywhere in the world on short notice. As a result the demands on our logistics systems have increased dramatically. As a nation we must be able to project and sustain overwhelming combat power sooner-in other words, put the right stuff in the right place at the right time with full knowledge that our inventory of supplies will be smaller. (Lynn, 1997: 13)

This change in strategy along with the ongoing downsizing of civilian companies and the continuing switch to intermodal systems has raised the possibility that civilian

munitions carriers may not be able to meet the demands of the new security strategy. Peacetime movement of ammunition is accomplished on a scheduled basis and primarily utilizes motor carriers. In a wartime scenario, shipments are required rapidly without advance notice. Also, plans call for most of the munitions to travel by rail due to volume and available capacity. This disconnect between the peacetime and wartime systems is a potential stumbling block in the transportation of munitions. The availability of civilian carriers during wartime needs to be identified and in particular, the transition period from peace to war should be examined.

Research Question

The primary question addressed in this research paper is:

Can the civilian munitions carrier industry (both rail and truck) meet the requirements of the Department of Defense during two near simultaneous major theater wars?

The secondary questions addressed by this thesis are:

1. What is the current distribution system from the depots to the seaports?
2. What is the Mobility Requirements Study Bottom-Up Review Update (MRS BURU) and can civilian munitions carriers meet MRS BURU requirements?
3. What are the Military Traffic Management Command (MTMC) Surface Distribution Plans One (SDP-1) and Two (SDP-2) and can civilian munitions carriers meet MTMC's SDPs?
4. What can be done to enhance civilian munitions carrier response?

Organization

This thesis has five chapters. The first provides a brief introduction to this topic and outlines how this study was pursued. Chapter 2 gives the reader an understanding of the current Army munitions depot system and how munitions are moved from the depot to the ports of embarkation. It also details issues surrounding the use of containers for the transportation of munitions and the effect of intermodal transportation systems. Chapter 3 focuses on the requirements in the Mobility Requirement Study, Bottom-Up Review Update (MRS BURU). This chapter analyzes the capability of civilian munitions carriers to meet the demands of MRS BURU. Chapter 4 discusses two Surface Distribution Plans (SDPs) that the Army's Military Traffic Management Command (MTMC) has created to manage the movement of munitions during a near simultaneous dual major theater war (MTW) scenario. This chapter analyzes the capability of civilian munitions carriers to meet the requirements in MTMC's SDPs. Finally, Chapter 5 presents conclusions and recommendations to the issues presented.

II. The Army Munitions Depots and the Current Distribution System

Munitions Depots and the Tier System

To answer the primary research question of whether the civilian transportation industry can meet the requirements set forth by the Department of Defense, it is important to know how the current distribution system operates within the United States. The United States Army is the single manager for Department of Defense munitions. It is considered the Single Manager for Conventional Ammunition (SMCA). The SMCA works with the theater commanders to determine munitions requirements based upon training forecasts and operational plans. Under this program, the Army manages the production, storage and distribution of a full range of munitions and explosives. The Army's Industrial Operations Command (IOC) directs the production and storage of munitions while the Military Traffic Management Command (MTMC) manages the transportation of munitions from the storage areas to the seaports and airports.

During the Desert Storm period, the Army managed 21 depots for storing munitions and operated three main seaports (Lehman, 1998). This system met the demands of Desert Storm but it was large and unwieldy. Streamlining the process and implementing change was difficult with the large number of depots. Whenever the Army wanted to implement new changes to increase efficiency or safety, the large number of depots that were in place made it a slow and difficult process. With downsizing following Desert Storm, the large number of depots were no longer required.

In 1993, the Joint Chiefs of Staff conducted a sweeping Mobility Requirements Study (MRS) to analyze the full spectrum of mobility requirements for the Department of Defense. One of the byproducts of this study was a recommendation for "a smaller, safer, and better quality stockpile of ammunition with a reduced workforce using fewer storage installations" (Hancock and Lee, 1998: 15). As a result of the MRS, the Army has begun closing depots and consolidating their operations.

To streamline the process and make better use of personnel, a concept of tiers of service was proposed. Currently there are three divisions or tiers of depots. Future plans call for the Tier III depots to be closed and all depot activities to be consolidated into eight depots. These depots are subdivided into two tiers. The Tier I depots are designated to "store the first 30 days of war reserve ammunition and ammunition for training. The war reserve ammunition is shipped from the Tier I facilities first during a war. Tier II facilities store war reserve ammunition to be used after the first 30 days" (Hancock and Lee, 1998: 15). Figure 1 shows the locations of each of the Tier I and II depots as well as the three seaports designated for moving ammunition.

The locations of the depots were selected based upon peacetime requirements. Depots were placed to minimize transportation costs of munitions used for peacetime training and exercises. The nation was divided into three regions, East, Central, and West. Two Tier I depots were placed in the eastern region due to that region's higher concentration of military installations while each of the other two regions had one Tier I depot apiece.

The Tier I depots are manned continuously and handle the day-to-day munitions requirements of the Department of Defense. In addition to supporting normal training

requirements, the Tier I depots have war reserves for the first 30 days of a conflict pre-configured for transportation.

There are four Tier II depots and each Tier II depot reports directly to and supports one of the Tier I depots. The Tier II depots are maintained by a skeleton staff that ensures the facilities are maintained in proper working order. The staff also provides the trained core of personnel needed to run a Tier II depot during an actual contingency. The Tier II facilities are reliant upon the timely call-up of reservists to fully function. A Tier II depot is supposed to be fully operational and begin shipping munitions 30 days after the beginning of hostilities. From that point until the termination of the conflict(s), both the Tier I and Tier II facilities will ship sustainment munitions.

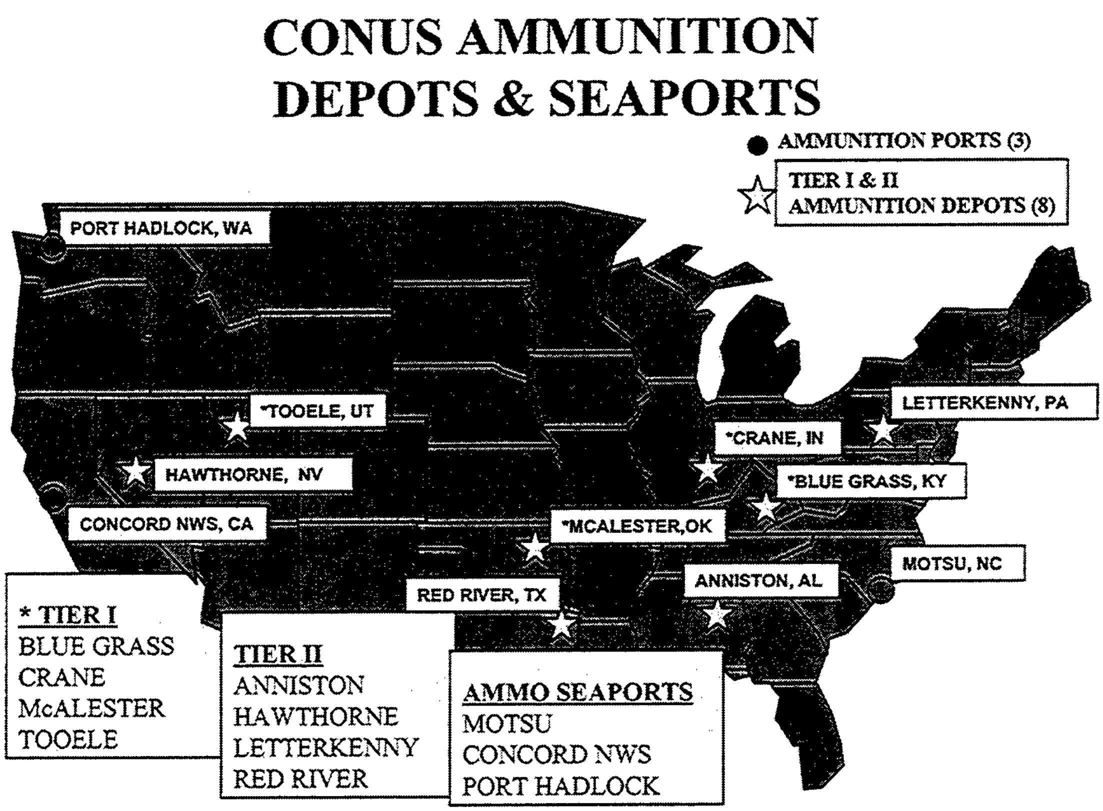


Figure 1. CONUS Ammunition Depots and Seaports (Lehman, 1998)

Due to the length of time the civilian rail industry requires to move empty railcars to the depots for loading during a contingency, the Army has purchased and prepositioned railcars at the Tier I depots to enhance their surge capabilities. "The DoD has railcars positioned at power projection points to allow the railroads approximately two weeks to get our rail cars into place" (Snodgrass, 1999). There are 321 DODX railcars and 410 ATTX cars prepositioned at the depots. Each DODX car will hold two 20-foot containers of ammunition. The ATTX cars are 60-foot railcars modified with spark shields and twistlocks to enable them to carry three 20-foot containers filled with munitions. The ATTX cars are capable of carrying a total of 1230 containers (Lehman, 1998).

Both the Tier I and Tier II depots maintain an infrastructure that includes rail lines and road networks connecting them to the nation's commercial transportation system. The Tier I depots maintain a stock of containers on hand to handle the initial surge until containers can be obtained from the commercial sector. Each depot has specialized equipment designed to put materials into containers as well as equipment designed to handle the containers themselves. If additional equipment is required, they will be leased from commercial sources. The depots also have staging areas for the preparation of materials. These staging areas have dunnage prepositioned for use in securing the ammunition within containers. Materials such as netting and pallets needed to ship munitions breakbulk are also kept at the depots, ready for a contingency.

The Army has programmed a large sum of money for infrastructure upgrades to the depots and the seaports. These upgrades are scheduled for completion by the end of

fiscal year 2003. Most of these upgrades are to meet the requirements introduced by containerizing ammunition.

Containerization

The civilian transportation sector has gone through revolutionary changes in the past decade. During that period, companies began the move towards the containerization of goods. By containerizing items, loss due to theft or damage is reduced significantly. At the same time tracking and moving the container is cheaper and simpler than by the old method of shipping items breakbulk.

As the civilian sector moved towards containerization, the Department of Defense realized it needed to re-examine its methods for shipping goods. One type of materiel that was identified for its suitability for containerization was munitions. "The DoD goal is to have 80% of munitions transported in containers by the year 2000" (Axelson, 1997: 14). Most of the munitions not containerized are naval stores that must be shipped breakbulk due to the nature of resupply methods that the Navy uses at sea. Past experience has shown the value of containerizing ammunition. "One of the more important lessons learned during the Desert Shield deployment and sustainment operations was the value of containerization, particularly for the movement of ammunition" (Fogleman, 1994: 45).

Despite reducing damage and pilfering as well as speeding up the movement of the munitions, containerization does have its costs.

> Moving ammunition in containers involves an enormous infrastructure, which is provided by commercial and military resources. The infrastructure is part of the Defense Transportation System (DTS). The DTS incorporates sealift, airlift, surface transportation, and prepositioned

> equipment to transport ammunition, supplies, equipment, and personnel to the warfighter. (Hancock and Lee, 1998: 60)

Seventy-one million dollars was spent on upgrades for various projects during the period from fiscal year 1993 to 1997. Another 134 million dollars is required between 1998 and 2002 to fully fund the needed improvements (Shaw, 1998). By utilizing containers for moving ammunition, the civilian carriers will be forced to make changes to their equipment. "This means that commercial carriers must purchase flatbeds and have twist locks installed in order to participate in this traffic" (Axelson, 1997: 14).

Although the initial costs to containerize munitions are high, the benefits outweigh the costs. The amount of time saved in loading ships via containers versus breakbulk is significant and leads to savings in manpower costs and the costs to lease container ships.

> USTRANSCOM estimated that six containerships could haul the equivalent of 18 breakbulk ships. Containerization would also speed deployment because container ships could be loaded and unloaded faster than breakbulk ships. In addition, USTRANSCOM stressed that containerization of unit cargo and ammunition would speed deployment by capitalizing on the commercial industry's intermodal expertise and capabilities. Furthermore, the command argued it could save money, increase security, and improve intransit visibility through containerization. (Matthews and Holt, 1996: 185)

After the conflict, Army Lieutenant General Hubert G. Smith noted that the efficiencies gained by containerization led to faster loading of ships. The average load time for a breakbulk ammunition ship was 8-14 days while stevedores were able to load a container ship at the Military Ocean Terminal, Sunny Point (MOTSU), North Carolina with containerized ammunition in 68-70 hours (Matthews and Holt, 1996: 185). The time required to offload the container ships is also quicker.

The savings in the number of ships required and the time to load and unload the container ships translates into increased lift capacity. The savings in resources by containerizing ammunition could be translated into improved capabilities for non-ammunition movements. As a result of switching to containerization, we now find that, "Containerization is a major part of the overall distribution supply chain, and ammunition is primarily moved in containers" (Hancock and Lee, 1998: 2).

Intermodalism

With the advent of containerization in the civilian transportation sector came a new system for transporting goods. This new system was intermodalism. "Intermodal transportation is a process which allows a shipper to move freight to various locations using any combination of the four primary modes: water, railroad, motor or truck, and air" (Arnold, 1980: 33). The shipping company will coordinate all aspects of a shipment to ensure the appropriate mode of transportation based on cost and speed is used.

> Each mode (trucking, rail, and water) is the low cost transporter for a certain range of distances. Trucking is initially the low cost transporter; then rail; and then, for very long distances, water shipments. Intermodal shipping allows the shipper of goods to take advantage of the lower costs associated with rail and water and still have the flexibility of door-to-door deliveries associated with trucking. (Moriarty and Turco, 1993: 35)

The intermodal system combines the benefits of door-to-door capabilities of the trucking companies with the low cost and volume of the rail industry. In the civilian sector, goods normally are packaged in containers at a factory or a warehouse and then are shipped via truck to a rail intermodal yard. At the rail yard, the container is offloaded from the truck and consolidated with other containers. These containers are then placed upon trains for movement to another intermodal yard in a different part of the country.

At the destination yard, the container is removed from the train and placed upon a truck. The truck then moves the container to its final destination. This method leads to economies of scale, thereby driving costs down. "Within CONUS, containers will move to a Port of Embarkation (POE) by rail or truck. The commercial industry, which is efficient in intermodal transportation, is normally used for these movements" (Hancock and Lee, 1998: 65).

A single shipper will be responsible for arranging the transportation of the container and tracking the container during the entire movement. "Intermodal transportation increases efficiency by allowing a single carrier to 'manage the documentation and movement of cargo' as it is transported via the different modes" (Ebertowski, 1992: 4).

As the civilian sector moves more and more towards an intermodal transportation system, the Department of Defense faces the challenge of keeping pace with a rapidly changing transportation environment. By relying upon containers for the distribution of ammunition, DoD must utilize intermodal methods to fully gain the benefits derived from the civilian system.

The Current Transportation System

Transporting munitions within the United States is reliant upon civilian assets. The use of civilian companies is mandated by Department of Defense policy and is also the best use of resources. "While the Army possesses truck companies capable of transporting ammunition and explosives, DoD policy calls for maximum use of commercial transportation service. Use of organic assets is reserved for essential training

and for shipments not conducive to commercial transportation movement" (Sweetland, 1993: 11).

In peacetime, stateside movements of munitions occur in small lots, generally using trucks. Approximately 80% of all peacetime munitions movements utilize motor carriers (Roll, 1998). In 1996 the commercial sector transported more than 500,000 tons of DoD munitions with 70% of that being hauled on trucks (Axelson, 1997: 14). For overseas movements during peacetime, United States Transportation Command schedules the movement via ship. Generally, motor carriers and railcars are loaded at the depots and then moved to one of the three munitions seaports.

> During peacetime operations, the object is to minimize costs while meeting the Required Delivery Date (RDD) for each service or to support operations. Only two ships sail with ammunition to locations overseas each year, either to Europe or the Pacific. In recent years, USTRANSCOM has used these ammunition shipments to evaluate the Containerized Ammunition Delivery System (CADS) in exercises called TURBO CADS. TURBO CADS addresses and studies the operation of transporting ammunition intermodally. (Hancock and Lee, 1998: 58)

The drive to lower costs has had an affect upon the overall munitions carrier industry. This is a small niche market within the trucking industry and the return on investment is low. "When compared to the entire motor carrier industry, munitions carriers comprise less than 0.05 percent of motor carrier companies, revenue, and employment" (Sweetland, 1993: 3).

During an actual contingency or war, the ratio between truck and train changes. Approximately 90% of the munitions are scheduled for transport by rail during a contingency (Roll, 1998). One potential problem is the availability of railcars.

> Rail has a tremendous intermodal asset base with over 107K of 180K total platforms capable of hauling 20' containers. However, with current

> commercial demand at over 96% use of these assets, DoD access is limited. Munitions carriers on the other hand, operating in a very competitive niche market, are readily available today to meet both our peacetime and wartime requirements, but have an extremely limited asset pool of only 2220 DTTS (Defense Transportation Tracking System) registered tractors and approximately 1240 qualified driver teams. (Lehman, 1998)

Regardless of whether the munitions are moved during peace or war, they move in generally the same way when moved by container. They are packed in twenty-foot containers at the depots and then are loaded onto either a truck or a railcar. If the container is loaded onto a truck, it is then moved via the nation's interstate highway system to one of the three ammunition seaports. If moved by rail, the depot will load enough railcars to form a unit train. Then the rail company will move the train from the depot to the ammunition seaport. Since there is no rail lines extending to Port Hadlock, Washington, any munitions being moved there via rail must be downloaded at a rail terminal approximately 30 miles away, loaded onto trucks and then driven to the port.

The methods used by DoD to transport munitions do not take full advantage of the civilian system. By forcing the rail industry to move their assets into the ammunition depots, the rail industry has to operate in a manner that is at odds with their normal mode of operation. "COFC (Container on Flatcar) cars are not currently used by DoD, therefore almost 100% of what is required needs to be pulled from commercial customers. The COFC cars today are used in intermodal (hub to hub) service and the efficiencies are ruined when taken from this network" (Snodgrass, 1999).

Further exacerbating the problem is the high operations tempo that the rail industry is currently experiencing. With the booming national economy combined with recent consolidations and downsizing, the demands upon the rail industry are extremely

high. "The rail industry today is operating at near maximum capacity and is slow to respond to DoD. Long-term contracted customers and scheduled intermodal movements through intermodal marketing companies are taking priority over DoD's general merchandise movements" (Lehman, 1998). "If the economy took a down turn and we had assets sitting idle, we would be able to respond faster; however at this time, we do not have COFC cars in storage" (Snodgrass, 1999).

Due to the reliance upon the civilian sector for transportation assets, the Department of Defense faces significant unknowns in its ability to move munitions quickly. Issues such as the capability of the depots to outload containers at the planned rates are untested. This lack of testing has raised concerns within the civilian sector. One manager at Union Pacific voiced this concern. "Some of the projected output for numbers of containers during wartime at some installations is enormous -- and relatively untried at this time, because container handlers are still being purchased and there are few exercises of large magnitude during peacetime to practice" (Snodgrass, 1999). The Union Pacific manager goes on to say, "As the government changes its war time requirements, yet does not practice during peacetime what it requires during war, it strains the capabilities of both the installations and the rail carriers" (Snodgrass, 1999).

The Department of Defense does attempt to conduct annual exercises to test the distribution system, but these tests, known as TURBO CADS (Containerized Ammunition Delivery System) are relatively small in scale and do not stress the system at the level two major theater wars would. What these tests do accomplish is to highlight areas that do need improvement.

Efficient use of the civilian transportation will allow DoD to meet the requirements outlined in MRS BURU. These requirements are the baseline for all mobility enhancements and upgrades.

III. MRS BURU

What Is MRS BURU?

With the collapse of the Soviet Union and the end of the Cold War, the United States faced a changing world environment. As a result of this change, a new strategy was developed that moved the focus from a European land war with the Warsaw Pact to a strategy dealing with regional conflicts. The new strategy called for the military to be able to respond to two near simultaneous major regional conflicts (MRC) or major theater wars (MTW). This change in strategy prompted the Joint Chiefs of Staff to conduct a thorough study of the United States military in 1993.

In addition to reviewing the military, the Department of Defense conducted a study of mobility requirements know as the Mobility Review Study or MRS. This study was combined with a Defense-wide Bottom-Up Review Update or BURU. In combination, they became known as MRS BURU. "The MRS BURU scenario depicts an MRC closely followed by a second MRC where the enemies' attacks are stopped prior to achieving essential objectives. The attacks are stopped by the rapid delivery of halting forces composed of in-place, prepositioned, and airlifted forces" (Rutherford, 1995: 3).

MRS BURU established the requirements that the Department of Defense needed to meet. It was used to establish budgets and guided the Pentagon when new items had to be purchased or upgrades to existing facilities were required.

> Our ability to meet the MRS BURU requirements of dual, nearly simultaneous major regional conflicts is a function of assumptions, force requirements and delivery timelines. It should be remembered that MRS

> BURU is a planning tool helping to guide the debate on the kind and amounts of strategic mobility assets our nation should possess at the turn of the century. (Rutherford, 1995: 3)

MRS BURU is based upon near simultaneous conflicts in Southwest Asia (SWA) and on the Korean peninsula. Planners assume a conflict will erupt in one of these two regions necessitating the deployment of troops from the United States to assist troops already in place in the theater to halt enemy aggression. Once the enemy is halted, more troops and equipment will be moved to the region to build-up forces for an offensive to drive the enemy out of occupied territories and to also destroy the enemy's ability to wage war on its neighbors. At some point during this process, hostilities will erupt in the other region. Forces already in place in the second theater will be joined by additional forces from the United States to act as a stopping force. Their task will be to stop and hold the aggressor until forces can be freed from the first theater. Once the enemy in the first theater is disposed of, further mobility assets and other resources will begin to support offensive operations in the second theater.

Planners have developed support plans for a variety of possibilities. One of the two near simultaneous plans is an East/West (E/W) scenario where aggression begins in Southwest Asia followed by attacks in Korea. The second possibility is a West/East (W/E) where action begins in Korea then swings to Southwest Asia. Each of these plans places different stresses upon the mobility system.

> The E/W scenario begins with a very challenging initial surge requirement within the first two weeks reflecting the lack of pre-positioned ammunition we have in the first supported theater (SWA). It is important to note here that the requirements are driven by the supported CINC (Commander-in-Chief) and cannot be simply smoothed out as some suggest. (Lehman, 1998)

Due to differences in prepositioned supplies and equipment between the theaters, the demands upon the mobility system varies dependent upon which scenario unfolds. When the Army's Military Traffic Management Command makes its plans for distribution of materials, it bases the plans upon the specific scenario.

> The E/W scenario provides the near simultaneous requirement that DoD is building towards and it is what drives Strategic Mobility enhancement funding, allowing us to work toward a programmatic fix if needed. Furthermore, although the W/E scenario is ultimately more challenging, this scenario (E/W) places much greater stress on the transportation system within the first two weeks of a dual-MTW than did any of the other scenarios. (Lehman, 1998)

The requirements for munitions that MRS BURU calls for are extremely large. During Desert Shield/Storm, approximately 477,000 tons of ammunition was shipped to Southwest Asia. These munitions were moved from 21 depots through three seaports over a 32 week period. In contrast, MRS BURU calls for 900,000 tons of munitions to be moved from eight depots through three seaports in 16 weeks (Lehman, 1998). MRS BURU requires nearly twice the volume of munitions as Desert Storm in only half of the time. This contrast can be seen in Figure 2.

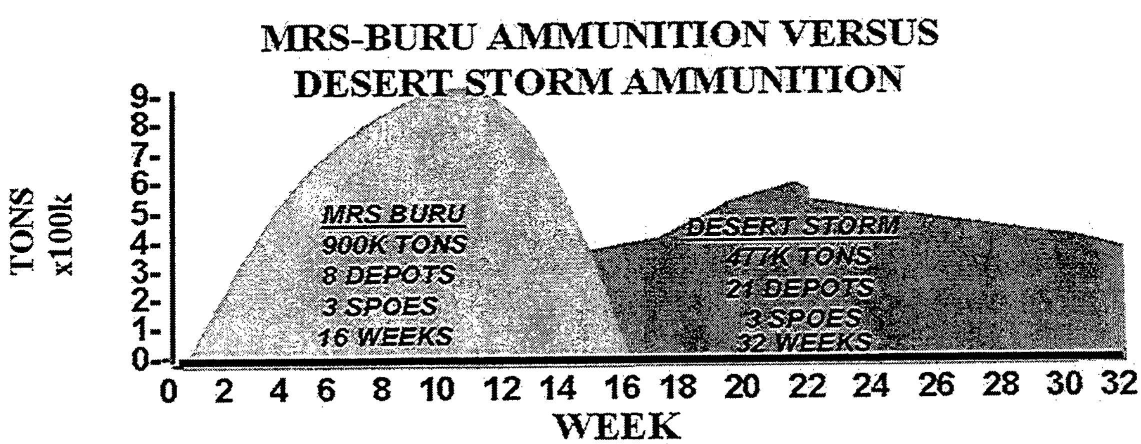


Figure 2. MRS BURU vs. Desert Storm (Lehman, 1998)

Transportation Assets Required to Meet MRS BURU

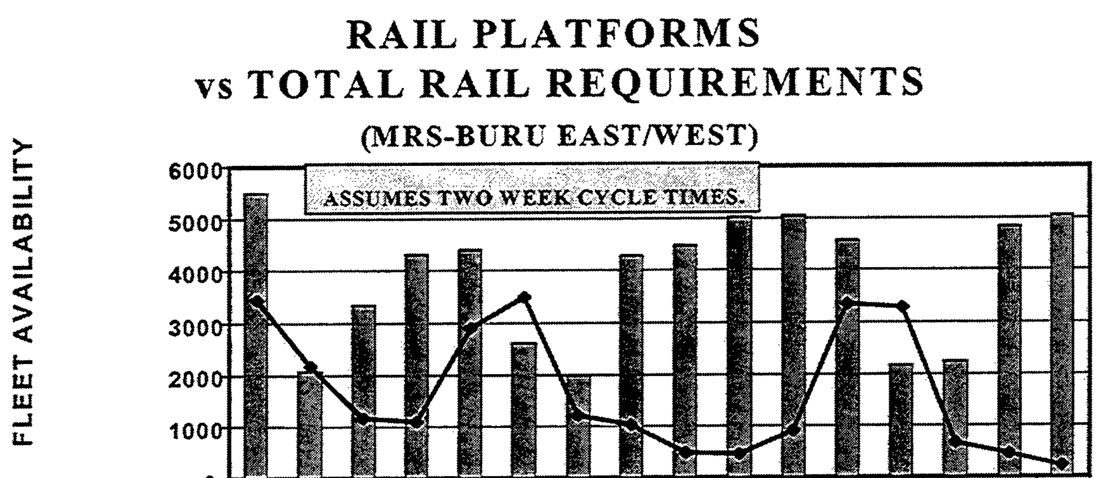
Meeting the requirements of the two Major Theater War (MTW) scenario of MRS BURU will require significant numbers of motor carriers and railcars. Planners at the Army's Military Traffic Management Command (MTMC) utilize the MRS BURU E/W scenario for their planning due to its extremely high demand for munitions during the first fews weeks of the conflict (Lehman, 1998). The E/W scenario has hostilities beginning in Southwest Asia followed by a conflict on the Korean peninsula.

Figure 3 shows the total number of rail platforms required to meet the requirements of the MRS BURU E/W scenario. Figure 3 also depicts the number of platforms that plans officers at the Army's Military Traffic Management Command (MTMC) estimate would be readily available to meet MRS BURU requirements. The term 'platform' is used by the rail industry to describe a railcar capable of carrying one 40-foot container or two 20-foot containers. Figure 3 assumes that it will take a platform two weeks to cycle from the depot to the seaport and back to the depot (Lehman, 1998).

As can be seen in Figure 3, the total asset base includes the Army-purchased DODX and ATTX platforms that are prepositioned at the depots. It also includes 4237 platforms from the civilian sector. This number was arrived at by determining the number of ammunition capable platforms (105,919) and multiplying it by the percentage of rail assets idle at the time of the study. MTMC estimated that the rail industry was operating at approximately 96% thereby leaving 4% idle.

Figure 3 also assumes that the civilian railcars will arrive at the depots within one week. According to a manager at Union Pacific, the 96% utilization rate is a realistic

number and he estimates that in a wartime scenario, Union Pacific could move railcars from any point in its system to any other point within three days (Snodgrass, 1999). A sales executive at CSX echoed these estimates by saying, "In an emergency situation we would have to activate any needed assets into position to fill wartime requirements. We would do so by routing empty cars to the needed points and even emptying loaded cars to expedite them to the points necessary for loading" (Hicks, 1999).



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TOTAL AVAIL	5494	2058	3340	4321	4412	2608	2003	4294	4478	5031	5045	4582	2160	2230	4830	5044
TOTAL REQ	3436	2154	1173	1082	2886	3491	1200	1016	463	449	912	3334	3264	664	450	214

ASSET BASE INCLUDES:
642 DODX PLATFORMS (321- 89' RAILCARS)
615 ATTX PLATFORMS (410 - 60' RAILCARS)
4237 INDUSTRY PLATFORMS (4% OF 105, 919)
5494 TOTAL RAIL PLATFORMS

Figure 3. MRS BURU Rail Requirements (Lehman, 1998)

Even with this large number of platforms, there are still shortages of railcars in weeks two, six, and thirteen. If railroad utilization falls only two percentage points to 94%, the movement of munitions would have no impact on the movement of civilian

goods. Of course, during this period DoD will be requiring an even greater number of rail assets to move Army units and their equipment from their forts to the seaports. With the impact of munitions movements plus unit moves, there will be significant affects felt in the civilian transportation industry.

Figure 4 shows the demand from the MRS BURU E/W scenario placed upon the Defense Transportation Tracking System (DTTS) trucks operated by the civilian munitions motor carriers. "DTTS monitors all intra-CONUS arms, ammunition, and explosives shipments moving by truck. It performs this task using a commercial satellite tracking surveillance service, which provides DTTS with hourly truck location reports, intransit truck status change, and emergency situation notifications" (USAF AMWC, 1996). As of March 1998, there were 2220 DTTS registered trucks (Lehman, 1998).

Figure 4 assumes a one-week cycle time for the motor carriers to move from the depots to the seaports and back to the depots. The demand for trucks is similar to the demand seen for rail and the largest demand occurs in the first three weeks of the scenario. One advantage the trucking industry has over rail is that by being in a niche market, the motor carriers can respond quicker than the rail industry to a crisis. A manager at Landstar estimates that at any given time, his company would have approximately 80% of its trucks and drivers available for service. These trucks and drivers could be in place at the depots within 24 hours of notification (Larson, 1999).

At no point in time does the demand for trucks outstrip the total number of DTTS-registered tractors. Even at 80% availability, there would be 1776 tractors available, easily meeting the requirement.

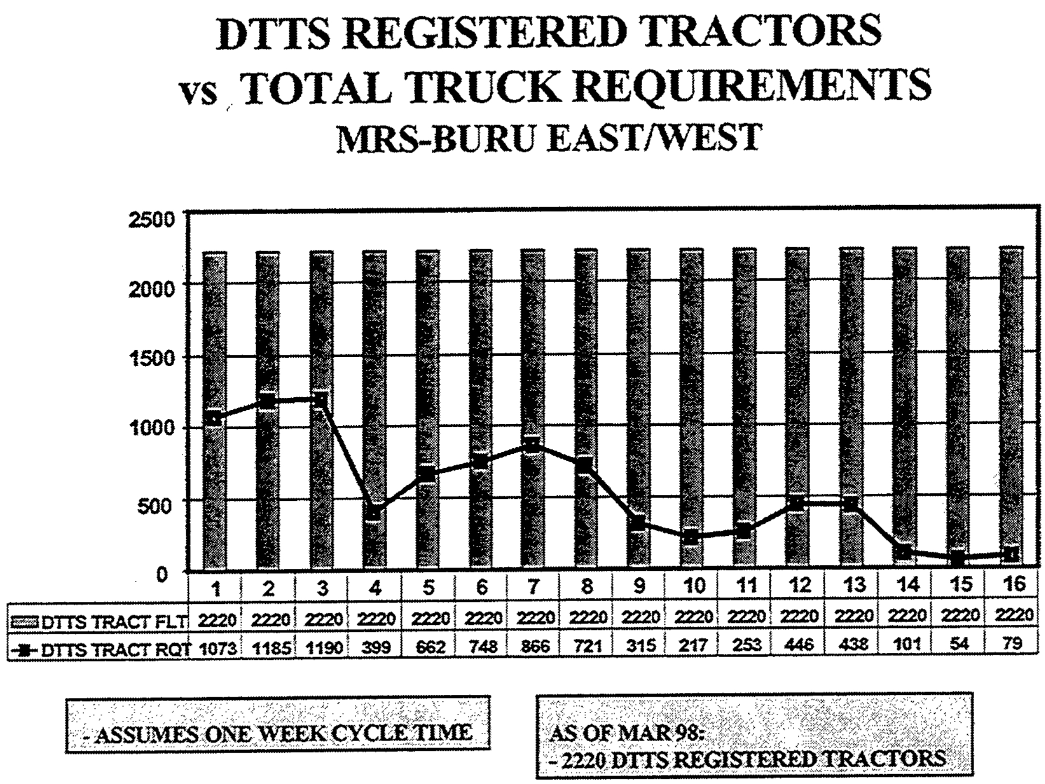


Figure 4. DTTS Registered Trucks (Lehman, 1998)

More restrictive than the number of DTTS tractors is the number of trained and available driver teams. Figure 5 depicts the number of qualified driver teams available to haul munitions as of March 1998. Department of Defense requires drivers to be specially trained and certified to haul munitions. These drivers also undergo a stringent security assessment. The drivers are required to travel in teams of two with one of the drivers remaining with the vehicle at all times for security purposes. Recruiting, training, and retaining these drivers is a difficult and costly task for the companies.

The commercial industry moved 500,000 tons of munitions in 1996 with 70% of that on trucks. In 1953 the Department of Defense (DoD) had

over 150 approved munitions carriers and in 1997, there are only 8 doing over 95% of the traffic. The reason for the drastic change in numbers is based on costs. All but two of the top ten major trucking carriers avoid government munitions because of the losses associated with training drivers, equipment, satellite costs for monitoring, and security background clearances. (Axelson, 1997: 14)

Figure 5 shows the affects if 100% of the driver teams were available for service. With 100% of the certified teams there would never be a shortage of driver teams. But, when analyzed at a more likely 80% availability (20% unavailable due to illness, vacation, training, etc…) or 992 teams (the dotted line on Figure 5 depicts this lower number), shortages would occur each of the first three weeks.

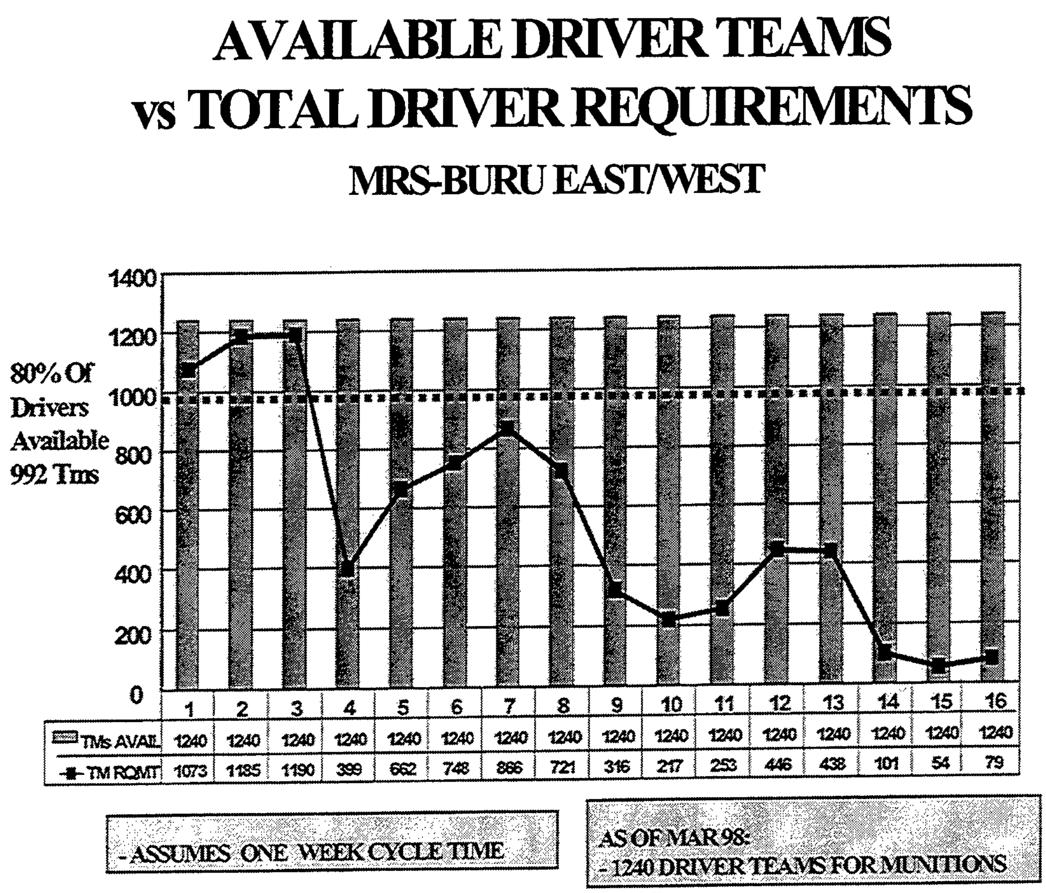


Figure 5. Driver Teams Availability (Lehman, 1998)

Both Figure 4 and 5 fail to show the most significant problem. Military planners haved anticipated that the motor carriers will handle shortages in the rail industry. For the planned movement of containers by rail, there is a 192 platform shortage in week two, a 1766 platform shortage in week six, and a 2208 shortage of platforms in week 13 (Lehman, 1998). The available driver teams cannot currently meet this additional demand.

At an 80% availability or 992 driver teams available, the driver teams are unable to meet the motor carrier requirements in weeks one through three without adding the shortage found in the rail industry. The shortages in these first three weeks are overshadowed by the severity of the shortages seen in weeks six and thirteen. It is projected that there will be a shortfall of 1622 containers in week six and 1754 containers in week thirteen.

IV. MTMC Surface Distribution Plans

What are MTMC's Surface Distribution Plans?

The Army's Military Traffic Management Command (MTMC) is responsible for writing the plans detailing the movement of munitions during both peace and war. MTMC has created two Surface Distribution Plans (SDPs) to manage the flow of munitions during two Major Theater Wars (MTWs).

> The SDP is based on a sourced OPLAN (Operations Plan) TPFDD (Time-Phased Force Deployment Data) and is therefore constrained by real world capabilities. It is not everything the CINC actually wants, but what can be provided and flowed through the depots and the seaports. You must remember that an approved OPLAN must be deemed 'Transportation Feasible' which means that the infrastructure and strategic lift is available within the timeframe. On the other hand, the MRS BURU is what the CINCs would actually like to have if they could. (Lehman, 1999b)

SDP-1 "Determines the assets required to deploy forces, sustainment, and ammunition from point of origin to the seaport of embarkation (SPOE). It covers the first 75 days of a major deployment" (Headquarters MTMC, 1996a: 1). SDP-2 covers the first 120 days versus the first 75 days for SDP-1 (Headquarters MTMC, 1996b: 1).

Both plans focus on 15 Army power projection locations, two Marine Corps bases, and the Defense Logistics Agency depots. The SDPs are used for planning purposes only and it has the primary benefit of allowing the commercial sector an opportunity to determine if they can support the requirements (Headquarters MTMC, 1996a: 1 and 1996b: 1).

The Military Traffic Management Command personnel utilize computer models to determine the optimal mix of transportation modes. They input the requirements and the restrictions, then they calculate the routing. The decision-making logic used is based upon distance and volume. Motor is the preferred mode for any movement of less than 800 miles and less than twenty 20-foot containers. Rail is preferred for movements exceeding 800 miles (Headquarters MTMC, 1996b: C-1).

Transportation Assets Required to Meet MTMC's Surface Distribution Plans

Tables 1 and 2 show the total transportation equipment required to move the ammunition called for in SDPs One and Two respectively. When compared with the availability of railcars, DTTS-registered tractors, and driver teams shown in Figures 3, 4, and 5 it is apparent that there is no shortage of available transportation assets to meet the requirements laid out in the Surface Distribution Plans.

Table 1. Total Equipment Required for SDP-1 (Headquarters MTMC, 1996a)

	Day	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	TOTAL
Rail	Platforms	273	289	480	419	329	738	468	787	567	187	176	175	175	175	170	175	5583
	Boxcars	116	66	85	13	19	32	14	16	1	6	0	0	0	0	0	0	368
Truck	Flatbeds	43	70	7	48	0	102	34	30	18	0	0	1	0	0	15	10	378
	Vans	177	42	119	59	61	177	0	1	15	0	0	0	0	0	0	0	651

Table 2. Total Equipment Required for SDP-2 (Headquarters MTMC, 1996b)

	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
Rail	Platforms	903	766	322	278	259	209	510	352	154	90	258	431	194	120	219	67	42	5174
	Boxcars	234	55	1	20	1	25	145	168	0	0	0	0	0	14	1	0	0	664
Truck	Flatbeds	155	127	74	49	16	36	56	106	22	34	4	108	68	0	1	23	0	879
	Vans	33	1	0	13	5	0	0	0	1	1	1	0	0	0	0	0	0	55

Each of the Surface Distribution Plans shows a large initial surge of munitions. In particular, SDP-2 has an enormous requirement in the first two weeks. The number of prepositioned railcars at the depots (731 cars or 1257 platforms) is not large enough to meet the demands of either plan without being augmented by the civilian rail industry. The speed in which these assets can arrive will determine the success or failure of the plan.

With 1257 platforms available, the Army-purchased railcars are capable of meeting the first 15 days of demand in SDP-1 but they are only capable of meeting the first week and a half of SDP-2. MTMC planners have assumed that it will take one week for civilian railcars to arrive at the depots for loading. A manager at Union Pacific estimated that in wartime, it would take a maximum of three days to move a railcar from one point in their system to any other point (Snodgrass, 1999). A sales executive at CSX went further to say that comparing the speed the rail industry moves during peacetime is not indicative of the speed cars would move through the system during a national military emergency (Hicks, 1999).

Neither of the Surface Distribution Plans comes close to maximizing the amount of trucking assets that are available. With 2220 DTTS-registered tractors and 1240 driver

teams working on a one week cycle-time (Lehman, 1998), only approximately 18% of the available driver teams are needed for SDP-1 and only 15% are needed for SDP-2. Assuming it takes longer than one week for civilian railcars to be available for loading at the depots, there would be a shortage of 212 platforms (Or 424 20-foot containers) in week two of SDP-2. Using the available and unused truck teams could easily make up this shortage.

V. Conclusions and Recommendations

Conclusions

The current programs that the Army and USTRANSCOM have implemented to move munitions from the depots to the seaports meet the requirements established in the Army's Surface Distribution Plans (SDPs). Current capabilities do not fully meet the requirements of MRS BURU. There would be shortages of rail in weeks two, six, and thirteen. If 100% of the driver teams were available, there would not be a shortage of motor carriers to meet their portion of the planned movement, but when analyzed at a more likely 80% availability rate, there would be shortages each of the first three weeks. These shortages are even larger and also encompass weeks six and thirteen when the shortage of rail is factored in. The assumption is that the motor carriers will cover shortages in the rail industry.

Future Operations Plans (OPLANs) will have different requirements as infrastructure upgrades are implemented. Currently, a new Mobility Requirements Study known as MRS-05 is under development. This new study will revise requirements outlined in MRS BURU. Since the SDPs are based upon the OPLANs, new SDPs will be published, changing the requirements.

> The SDP is based on the sourced CINC OPLAN. In reality the CINCs would like a whole lot more (unsourced) ammo a whole lot sooner, but are limited by the transportation infrastructure. As the ASMP (Army Strategic Mobility Program) & MEF (Mobility Enhancement Fund) enhancements are made to the infrastructure, the next iteration of the TPFDD (Time-Phased Force Deployment Data) should reflect this greater demand. (Lehman, 1999a)

As throughput at the depots and the seaports is increased, the volume of ammunition projected to be moved will likely increase to meet the desires of the theater commanders and the goals set forth in MRS BURU. When this occurs, the shortages currently seen in the munitions carrier sector's ability to support MRS BURU will be seen in the SDPs as well. MRS-05 will become the new benchmark that the distribution plan will seek to meet.

To overcome the potential shortfalls, the military can take a lesson from the civilian sector. To take full advantage of the container, intermodal transportation should be used whenever possible. Having the right equipment to stuff and move containers as well as the proper railcars is a necessity, but using them properly is also important.

> Due to the fact that more and more companies are moving to intermodal, more assets of this type of equipment are being purchased. However, it must be understood that these cars are usually run from 'hub' to 'hub,' or intermodal yard to intermodal yard, where the origin and destination portion is done by truck. So, to take them out of the intermodal network and deliver them directly to military installations hurts the turn around time, which decreases the number of cars available for loading. (Snodgrass, 1999)

The motor carriers have the capability to absorb some of the shortages seen in the MRS BURU scenario, but even with 100% of the driver teams available, shortfalls would occur. A shortage of 137 containers would occur in week two, a 1716 container shortage in week six, and a 1406 container shortage in week thirteen.

Recommendations

The civilian sector can currently meet the requirements established in the Surface Distribution Plans but future iterations will likely outstrip their capabilities to meet the

extremely high demands found early in the scenario. Smarter methods by the Department of Defense and the munitions carriers can correct these deficiencies. This section recommends five possible options for consideration.

Option One. The first option is to maintain the status quo. The current system meets the requirements as outlined in the Surface Distribution Plans. Also, it is likely that if there is an actual war going on, the rail industry will provide more rail service, quicker than is currently projected. If all of the railroads can move cars from any point in their system to any other within three days during a crisis (Snodgrass, 1999), it is likely that railcars will arrive in the depots in less than the one week planning factor. This option requires the Army's Industrial Operations Command to continue upgrading the depots and purchasing specialized container handling equipment needed to load the intermodal deepwell railcars. The cost for the container handling equipment is approximately $935,000 (Shaw, 1998).

Option Two. The current methods for the use of rail by the Department of Defense do not take full advantage of the intermodal system. By pulling railcars out of the system and running them to the depots for loading, the rail industry loses efficiency. The rail industry system is setup for trucks to bring containers to their intermodal yards where railcars are loaded. DoD could maximize the use of rail by retaining the current fleet of prepositioned railcars to handle the early surge and use the motor carriers to transport the remainder of munitions to the nearest rail intermodal yard. By implementing this plan, the efficiencies developed by the intermodal system can be fully utilized. The motor carriers would have less distance to travel, making for much shorter turn times.

Table 2 depicts the distances the eight ammunition depots are from the nearest intermodal railyard. The depots are shown on the left and nearby railyards are next. The column titled Railroad shows which railroad operates the railyard. NS stands for Norfolk and Southern, BNSF for Burlington Northern and Santa Fe, and UP stands for Union Pacific. As can be seen in Table 2, the furthest distance any depot is from a railroad intermodal facility is 180 miles for the Red River depot. These short distances would allow the motor carriers to make multiple runs per day.

Table 3. Distances from Depots to Intermodal Yards

	DEPOTS	INTERMODAL RAILYARD	RAILROAD	DISTANCE
TIER I	Blue Grass, KY	Louisville, KY	NS and CSX	100 Miles
		Cincinnati, OH	NS and CSX	115 Miles
		Charleston, WV	NS and CSX	160 Miles
	Crane, IN	Louisville, KY	NS and CSX	100 Miles
		Indianapolis, IN	CSX	100 Miles
	McAlester, OK	Dallas, TX	BNSF and UP	160 Miles
	Tooele, UT	Salt Lake City, UT	BNSF and UP	30 Miles
TIER II	Anniston, AL	Birmingham, AL	NS and CSX	40 Miles
		Atlanta, GA	NS and CSX	110 Miles
	Hawthorne, NV	Reno/Sparks, NV	UP	130 Miles
	Letterkenny, PA	Harrisburg, PA	NS	40 Miles
		Baltimore, MD	CSX	100 Miles
	Red River, TX	Dallas, TX	BNSF and UP	180 Miles

Another benefit that the railroads would gain from this system is the ability to mix and match munitions cargo with non-munitions cargo.

> Most COFC (Containers on Flat Cars) cars are capable of 'double stacking' containers, but that is not allowed with ammunition. However, if the ammunition containers were trucked to the rail intermodal yards ("hubs")

> then you keep them in the scheduled network and may possibly be able to double stack non-ammo loads on the top where they would be offloaded when they reached the destination hub. (Snodgrass, 1999)

The Army's Industrial Operations Command could save approximately $935,000 in Army Strategic Mobility Program funds by cutting the purchases of 22 pieces of container handling equipment needed to load containers onto the intermodal deepwell railcars used by the rail companies (Shaw, 1998). If the containers are trucked to intermodal railyards, this specialized container handling equipment will not be required.

<u>Option Three</u>. The greatest shortage in meeting MRS BURU occurs in week six and consists of 1716 containers. This equates to 572, 60-foot railcars. By purchasing 572 more ATTX railcars and prepositioning them at the depots, there would be no problem with shortages. The cost to implement this option would be somewhere between $24,596,000 and $32,604,000. This price is based upon the price paid in the most recent purchase contract. In that contract, the price of railcars ranged from $43,000 to $57,000 per car (Bowman, 1999).

<u>Option Four</u>. The Military Traffic Management Command (MTMC) has established two groups to facilitate the availability of munitions carriers. These are the Munitions Carrier Joint Planning Advisory Group and the Munitions Carrier Readiness Program. Through these two groups, MTMC is establishing critical relationships with the civilian community. During regular conferences, problem areas between the military and the civilian carriers are discussed and resolved. MTMC establishes wartime requirements with the railroads and the motor carriers through these conferences. These requirements outline the specific number of railcars and trucks required each day of the crisis.

MTMC could reward the companies that commit to this plan by utilizing them for munitions as well as non-munitions cargo. They would also have penalties outlined in the contract to penalize companies that fail to meet their requirements.

This option has the drawback that very little peacetime munitions are hauled by rail and the railroads are not interested in hauling peacetime munitions (Fore, 1999). This makes it difficult to have incentives that ensure that railcars will be available in a crisis.

MTMC needs to continue to foster their relationship with the munitions carrier industry. With a shrinking asset base, the munitions carriers will have a harder time meeting DoD requirements in the future. By reaching out and fostering relationships with trucking firms outside the munitions carrier industry, MTMC has the capability to obtain additional capacity during a major theater war.

This is a long-term effort but has already paid dividends. During the recent action in Kosovo, the demand upon the carriers was extremely high. In the early stages, support was not readily available but at later stages, due to the relationships developed since the inception of the Joint Planning Advisory Group, the munitions carriers were able to meet DoD's needs (Roll, 1999).

This partnership needs to extend beyond the core munition carriers to ensure future requirements are met. Organizations such as intermodal agents and companies that lease containers and container handling equipment need to also be included in a larger advisory group. With the growth of intermodalism, the intermodal companies have taken on greater importance. Recent events show the need to include companies that lease equipment. Approximately 40% of the containers delivered to the depots for use in moving ammunition to Europe for operations in Yugoslavia had to rejected for various

reasons. This created delays in the movement of munitions. Including the leasing companies in planning groups would prevent future problems from occurring (Roll, 1999).

Option Five. One of the reasons for the large spikes early in the MRS BURU E/W scenario is due to a lack of prepositioned munitions in Southwest Asia. Another spike occurs around week six and seven when the Korean conflict begins. By prepositioning more munitions, especially the Air Force's precision-guided weapons, these spikes would be alleviated. By removing these spikes, the current system would be able to handle the MRS BURU requirements. Spending money on more precision weapons means that fewer overall munitions are required. "The development of new technologies such as laser guided bombs, artillery projectiles, and the future development of high-lethality technologies will reduce the volume of ammunition needed for future conflicts" (Hancock and Lee, 1998: 17).

> The cost of these weapons has grown considerably, but the cost of transporting them has actually been reduced. It is becoming more cost-effective to have fewer, but smarter weapons as long as we maintain the capability to deliver them where and when they are needed. Previously DoD maintained large stockpiles within each theater. Today the requirement to sustain two nearly simultaneous regional conflicts and budgetary pressure to minimize the investment in war reserve inventory have required DoD to cut inventories and distribute materials into common user stockpiles to support multiple theaters. (Fogleman, 1994: 41)

The greater lethality and accuracy of individual weapons means fewer weapons are required per target, thereby reducing overall demand for munitions.

Summary

Option one is the conservative route since it would require no changes to the current system. Since the current system meets the requirements set out in the Surface Distribution Plans, changes to meet these requirements are not needed. Unfortunately, the current system does not meet MRS BURU requirements which is the true goal. Without change, the MRS BURU requirements cannot be met, making Option one unattractive.

Option two would benefit the civilian railroad industry by utilizing their intermodal system and would maximize the use of the motor carrier industry at the same time. Further study to determine whether this option can meet the demands outlined in MRS BURU and the Surface Distribution Plans would need to be accomplished. Assuming that this option would meet the requirements, the Department of Defense would be able to save money on infrastructure upgrades required to load intermodal railcars. DoD would also be able to take advantage of the benefits of the intermodal system. Option two could potentially be the best approach.

Options three and five would incur major expenditures of funds to implement, making them unlikely due to budgetary constraints.

Finally, option four is an ongoing process. The current advisory groups should be enlarged and continued. Regardless of any other option, this option should be continued.

Maintaining the status quo is not a viable alternative since the current system does not meet the requirements of MRS BURU. Instead, a combination of alternatives would best deal with the current shortfalls. Implementing Option two would allow the rail industry to maximize its intermodal expertise while reducing the amount of container

handling equipment that the Army would have to purchase. Purchasing more rail cars should also be pursued. It is unlikely that the money for 572 rail cars would be available but any additional cars would reduce the current shortfalls. By purchasing 162 more 60-foot rail cars, shortages found in the first five weeks would be solved. This would provide the Army and the civilian industry time to move additional resources to the depots, thereby overcoming the deficits. Finally, MTMC should continue the current dialogue with the civilian munitions carriers. These meetings may not be able to generate additional driver teams, but it does allow the industry experts an opportunity to share ideas which will likely result in more efficient uses of resources.

Appendix A: Acronyms

ASMP	Army Strategic Mobility Program
BNSF	Burlington Northern and Santa Fe Railroad
CADS	Containerized Ammunition Delivery System
CINC	Commander-in-Chief
COFC	Container On Flatcar
CONUS	Continental United States
CORE	Contingency Response Program
DoD	Department of Defense
DTS	Defense Transportation System
DTTS	Defense Transportation Tracking System
IOC	Industrial Operations Command
MEF	Mobility Enhancement Fund
MOTSU	Military Ocean Terminal, Sunny Point
MRC	Major Regional Conflict
MRS BURU	Mobility Requirements Study, Bottom-Up Review Update
MTMC	Military Traffic Management Command
MTW	Major Theater War
NS	Norfolk Southern Railroad
OPLAN	Operations Plan
POE	Port of Embarkation
RDD	Required Delivery Date
SDP-1	Surface Distribution Plan # 1
SDP-2	Surface Distribution Plan # 2
SMCA	Single Manager for Conventional Ammunition
SWA	Southwest Asia
TPFDD	Time-Phased Force Deployment Data
UP	Union Pacific Railroad
USTRANSCOM	United States Transportation Command

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Vita

Major Richard Leatherman was born on 8 January 1963 in Wadsworth, Ohio. After graduating from Rutherford B. Hayes High School in Delaware, Ohio in 1981, he attended the University of Akron and received a Bachelor of Arts degree in Political Science. He received his commission on 6 Mar 1987 through Officer Training School. He received a Master of Arts degree in Management from Webster University.

He completed Specialized Undergraduate Navigator Training in December of 1987 and was assigned to McGuire AFB, New Jersey as a C-141B Navigator. While at McGuire, he held positions as an Evaluator Navigator and as Assistant Chief, Wing Tactics. In 1993 he was transferred to Altus AFB, Oklahoma where he was a formal schoolhouse instructor and evaluator and worked as Wing Safety Officer. In 1996, he moved to Charleston AFB, South Carolina where he was a Flight Commander and a Special Operations Low Level II (SOLL II) Evaluator Navigator.

In 1998, he entered the Advanced Study of Air Mobility program at the Air Mobility Warfare Center located on Ft. Dix, New Jersey. This is an Air Mobility Command-sponsored masters degree program administered by the Air Force Institute of Technology.

He has accumulated more than 3,400 flying hours and has flown in numerous operations including JUST CAUSE and DESERT SHIELD/STORM. He has also been a stage manager in Operations DESERT SHIELD/STORM and RESTORE HOPE.

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AFIT Control Number AFIT/GMD/LAL/99E-7

AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. **Please return completed questionnaire** to: AIR FORCE INSTITUTE OF TECHNOLOGY/ ENA 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765. Your response is **important.** Thank you.

1. Did this research contribute to a current research project? a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?
a. Yes b. No

3. **Please estimate** what this research would have cost in terms of manpower and dollars if it had been accomplished under contract or if it had been done in-house.

Man Years__________ $__________

4. Whether or not you were able to establish an equivalent value for this research (in Question 3), what is your estimate of its significance?

a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments (Please feel free to use a separate sheet for more detailed answers and include it with this form):

____
Name and Grade

____
Organization

____
Position or Title

____
Address